

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 32 and 33 have been cancelled without prejudice or disclaimer.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1, 2, 4, 7-17, 20, and 23-31 are now pending in this application.

Rejection under 35 U.S.C. § 112

Claims 1, 2, 4, 7-17, 20, and 23-33 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. This rejection is respectfully traversed.

In particular, the Office argues on page 3 of the Office Action that the disclosure of the application does not provide support for the language “a polygonal cross section.” The Office indicates on page 3 of the Office Action that the disclosure of the application provides support for a rectangular cross section. Claim 1 has been amended to recite that the first metal fibers have a rectangular cross section. Applicant respectfully submits that the amendments to the claims render this rejection moot.

The Office argues on page 3 of the Office Action that the disclosure of the application does not provide support for the first metal fibers having an equivalent diameter of less than 30 μm , as previously recited in claim 29. The Office suggests on page 3 of the Office Action that the disclosure of the application does provide support for the second metal fibers having an equivalent diameter of less than 30 μm . Applicant respectfully submits that the amendments to claim 29 render this rejection moot.

The Office argues on pages 3-4 of the Office Action that the disclosure of the application does not provide support for the features of claims 32 and 33. Claims 32 and 33 have been cancelled without prejudice or disclaimer.

For at least these reasons, reconsideration and withdrawal of these rejections is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 1, 2, 4, 7-17, 20, and 26-33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,554,225 to Sounai *et al.* (hereafter “Sounai”) in view of U.S. Patent No. 6,562,507 to Cisar *et al.* (hereafter “Cisar”) and U.S. Pub. No. 2002/0142202 to Li *et al.* (hereafter “Li”). This rejection is respectfully traversed.

Sounai discloses a molten carbonate fuel cell with a cathode 14, an anode 15, an electrolyte layer 13, and an interconnect 12. See Sounai at col. 4, lines 19-30. Each of the cathode 14 and anode 15 include a first porous layer 18 formed at a side of the electrolyte layer 13 and a second porous layer 19 formed at the opposite side. See Sounai at col. 4, lines 36-42, and Figure 2. Sounai discloses that the first porous layer 18 and the second porous layer 19 have a porosity of 60-80%. See Sounai at col. 4, lines 42-52.

Sounai discloses that the pore size of the first porous layer 18 is set to allow capillary action and that the pore size of the second porous layer 19 is set to not allow the capillary action, with the first porous layer 18 having a small pore size and the second porous layer 19 having a large pore size. See Sounai at col. 5, lines 25-29, 41-46, and Figure 2. Sounai discloses that the first porous layer 18 has a pore size of 0.3 to 20µm, while the second porous layer 19 has a pore size of 21 to 50 µm. See Sounai at col. 4, lines 44-52.

Sounai does not disclose or suggest a stack comprising, among other things, an impermeable metal structure, at least one first metal fiber layer, said first metal fiber layer comprising first metal fibers, said first metal fibers having a rectangular cross section, and at least one second metal fiber layer, said second metal fiber layer comprising second metal fibers, as recited in amended claim 1. Claims 2, 4, 7-17, 20, and 26-33 depend from claim 1.

Sounai is silent in regard to first metal fibers having a rectangular cross section.

Nor does Sounai disclose or suggest that such first and second metal fiber layers are sintered to each other, as recited in claim 1.

In addition, Sounai does not disclose or suggest the planar air permeability recited in claim 1. The Office argues on page 6 of the Office Action that although Sounai does not disclose or suggest the planar air permeability of claim 1, one of ordinary skill in the art would have expected the porous body of Sounai to have the claimed planar air permeability because Sounai discloses the porosity recited in claim 1 with an even distribution of porosity and because “[a]ir permeability is a function of porosity, pore size and the distribution of the porosity.” In other words, the Office argues that Sounai discloses a similar porosity as claimed and because of this the porous body of Sounai would have the planar air permeability claimed. Applicant respectfully disagrees.

Planar air permeability is complex and is determined by more parameters than simply porosity, pore size, and a distribution of porosity. Other parameters affect permeability. For instance, the enclosed declaration by Johan Vandamme under 37 C.F.R. § 1.132 demonstrates that the method of bonding stainless steel fibers affects the air permeability of the fibers, with a web made of sintered fibers having an air permeability 23% higher than a web made of fibers bonded by capacitor impulse welding. In addition, the enclosed declaration by Dr. Lieven Vangheluwe under 37 C.F.R. § 1.132 demonstrates that the diameter and cross-sectional shape of fibers, whether they are made of cotton or metal, will affect air permeability.

As a result, one of ordinary skill in the art would have understood that planar air permeability depends on more than just porosity and the factors noted by the Office, but other factors, including the diameter and cross-sectional shape of fibers and the method of bonding fibers.

Further, Applicant notes that to rely upon inherency, a basis in fact and/or technical reasoning to reasonably support a determination that an allegedly inherent characteristic necessarily flows from the disclosure of the prior art must be provided. See MPEP § 2112,

Part IV, *citing Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency. See MPEP § 2112, Part IV, *citing In re Rijckaert*, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). Further, inherency may not be established by probabilities or possibilities. See MPEP § 2112, Part IV, *citing In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

Sounai does not provide guidance on these additional factors which affect the planar air permeability discussed above, including the diameter and cross-sectional shape of fibers and the method of bonding fibers. In the absence of such guidance and disclosure, Sounai cannot be said to necessarily or inherently provide the planar air permeability recited in claim 1. Thus, Applicant submits that Sounai does not provide the planar air permeability of claim 1.

Cisar does not remedy the deficiencies of Sounai discussed above because Cisar also does not disclose or suggest a stack comprising, among other things, an impermeable metal structure, at least one first metal fiber layer, said first metal fiber layer comprising first metal fibers, said first metal fibers having a rectangular cross section, and at least one second metal fiber layer, said second metal fiber layer comprising second metal fibers, as recited in amended claim 1. In addition, Cisar does not disclose or suggest the planar air permeability recited in claim 1. As discussed above, the determination of planar air permeability is complex and depends on numerous parameters, and Cisar does not disclose or suggest the planar air permeability recited in claim 1.

Li discloses a fibrous electrode including electrode filaments or fibers 30 having a shape and dimensions which vary in dependence on various factors, with the shape including ribbon shaped, cylindrical, or another suitable cross-sectional shape, such as rectangular, square, triangular, other polygonal, circular, and elliptical. See Li at paragraph 0050. However, Li also does not disclose or suggest the planar air permeability of claim 1 and therefore does not remedy the deficiencies of Sounai and Cisar.

For at least these reasons, the combination of Sounai, Cisar, and Li does not disclose or suggest all of the features of claim 1 and therefore does not render claims 1, 2, 4, 7-17, 20, and 26-33 to be unpatentable.

Claim 4

Claim 4 depends from claim 1 and is allowable over Sounai, Cisar, and Li for at least the reasons discussed above. Claim 4 further recites that the second metal fiber layer having a perpendicular air permeability of less than $200 \text{ l/min} \cdot \text{dm}^2$. Applicant notes that although the planar air permeability of a stack and the perpendicular air permeability for a second metal fiber layer are to a large extent independent from each other, the perpendicular air permeability will also be affected by various factors, including those discussed above for planar air permeability in regard to claim 1. Because Sounai, Cisar, and Li do not provide guidance on these factors or the perpendicular air permeability of a second metal fiber layer, the combination of Sounai, Cisar, and Li does not disclose or suggest the features of claim 4.

Claim 9

Claim 9 depends from claim 1 is allowable over Sounai, Cisar, and Li for at least the reasons discussed above. Claim 9 further recites that the stack has a transversal electric resistance less than $30 \cdot 10^{-3} \text{ Ohm}$. The Office argues on pages 7-8 of the Office Action that Cisar discloses a metal structure having a higher electrical conductivity than conventional bipolar plates or stack structures and that it would have been obvious to reduce electrical resistance and provide higher electrical conductivity. Applicant respectfully disagrees because the relationship between stack design characteristics and properties is quite complex, as discussed above for air permeability, and it would not have been obvious to one of ordinary skill in the art to provide the transversal electric resistance of claim 9 simply by considering only electrical resistance and conductivity, particularly when considering that a particular planar air permeability must also be provided.

For at least these reasons, reconsideration and withdrawal of this rejection is respectfully requested.

Claims 23-25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sounai, Cisar, and Li in view of U.S. Pub. No. 2002/0150808 to Uchida *et al.* (hereafter "Uchida"). This rejection is respectfully traversed. Uchida fails to remedy the deficiencies of Sounai, Cisar, and Li discussed above in regard to independent claim 1, from which claims 23-25 depend. Reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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